

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Alsobrook, et al.
Title: METHODS AND APPARATUS
FOR PROCESSING
VEGETABLES
Appl. No.: 10/777,667
Filing Date: February 10, 2004
Examiner: Not yet assigned
Art Unit: Not yet assigned

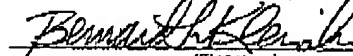
CERTIFICATE OF MAILING BY FACSIMILE

Date of transmission: April 29, 2004

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BERNARD L. KLEINKE

(Printed Name)


(Signature)

**DECLARATION OF BERNARD L. KLEINKE IN SUPPORT OF
RENEWED PETITION TO MAKE SPECIAL UNDER RULE 1.102(d)**

I, Bernard L. Kleinke, declare and state as follows:

1. I am an attorney licensed to practice before all the courts of the State of California and am an attorney with the law firm of Duckor Spradling & Metzger, attorneys of record for Applicants. I am a registered patent attorney (Reg. No. 22,123). I make this declaration in support of Applicant's Renewed Petition to Make Special that the patent application identified with serial number 10/777,667 (hereinafter the "Subject Application"). The statements made in this Declaration are true to my own knowledge, except those matters asserted on information and belief, which matters I am informed and believe are true.

2. The subject matter of the Subject Application relates to methods and apparatus for processing vegetables.

3. All claims in the Subject Application are directed to a single invention. If, however, the Patent and Trademark Office holds that the claims of the Subject Application are not obviously directed to single invention, Applicant hereby offers to make an oral election, without traverse.

4. A pre-examination search has been made by my office (hereinafter the "Search"). The search was made using the USPTO electronic website, allowing full-text search of all patents in all classes and subclasses from 1972 until April 2, 2004. A careful search was made of the database using the following Boolean search terms and combinations:

Search Combination	Classification Class/Subclass	Abstract	Specification
1	426/324	(onion OR onions OR scallion OR scallions)	_____
2	426/321	(onion OR onions OR scallion OR scallions)	_____
3	426/326	(onion OR onions OR scallion OR scallions)	_____
4	426/518	(onion OR onions OR scallion OR scallions)	_____
5	426/615	(onion OR onions OR scallion OR scallions)	_____
6	426/324	_____	(onion OR onions OR scallion OR scallions)
7	426/321	_____	(onion OR onions OR scallion OR scallions)
8	426/326	_____	(onion OR onions OR scallion OR scallions)
9	426/518	_____	(onion OR onions OR scallion OR scallions)
10	426/615	_____	(onion OR onions OR scallion OR scallions)

Search Combination	Classification Class/Subclass	Abstract	Specification
11	71/28	(onion OR onions OR scallion OR scallions)	_____
12	71/61	(onion OR onions OR scallion OR scallions)	_____
13	47/1	(onion OR onions OR scallion OR scallions)	_____
14	71/28	_____	(root)
15	71/61	_____	(root)
16	47/1	_____	(root)
17	71/28	(root)	_____
18	71/61	(root)	_____
19	47/1	(root)	_____
20	71/28	_____	(green AND (onion OR onions OR scallion OR scallions))
21	71/61	_____	(green AND (onion OR onions OR scallion OR scallions))
22	47/1	_____	(green AND (onion OR onions OR scallion OR scallions))
23	_____	(green AND onion)	_____
24	_____	(root AND vegetable)	_____
25	_____	(root AND (onion OR onions OR scallion OR scallions))	_____
26	_____	(processing AND (onion or onions))	_____
27	_____	(processing AND onions)	_____

Search Combination	Classification Class/Subclass	Abstract	Specification
28	_____	(processing and onion)	_____
29	_____	(green and onions)	_____
30	_____	(scallions)	_____
31	_____	_____	((root or roots) and crown) and (onion or onions))
32	_____	_____	(separating and ((root or roots) and (onion and onions)))
33	_____	_____	(pull and ((root or roots) and (onion and onions)))
34	_____	((cutting or severing or removing) and ((roots or roots) and (onion and onions)))	_____
35	426/324	(green and (((onion or onions) or scallion) or scallions)))	_____
36	426/321	(green and (((onion or onions) or scallion) or scallions)))	_____
37	426/326	(green and (((onion or onions) or scallion) or scallions)))	_____
38	426/518	(green and (((onion or onions) or scallion) or scallions)))	_____
39	428/615	(green and (((onion or onions) or scallion) or scallions)))	_____
40	_____	_____	((trim OR trimming) AND onion)

In addition to the above search terms, patent # 5,316,778 was examined and all of the patents referenced by patent # 5,316,778 were part of the search.

The Search located a large number of patents which I reviewed the titles of those most closely related to the subject matter encompassed by the claims of the Subject Application. From titles reviewed, 32 patents were selected as potentially close

and these patents were reviewed. A detailed discussion of the 32 patents is provided herewith. The 32 patents reviewed are also referenced on the accompanying Information Disclosure Statement.

Date: April 29, 2004

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Respectfully submitted,

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BERNARD L. KLEINKE

(Printed Name)

Bernard L. Kleinke

(Signature)

DETAILED DISCUSSION OF REFERENCES

Dear Sir,

The following is respectfully submitted as a detailed discussion of the references and how the claimed subject matter is patentable over the references:

United States Patent No. 3,989,110

This patent discloses a green onion harvester, which includes a plurality of means for grasping the foliage, severing the roots, withdrawing the green onions from the soil, sorting out undersized green onions, removing the lower leaves, and depositing the green onions in a collection bin. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,068,011

This patent discloses whole raw onions, as harvested, are cleaned and scalded sufficiently to slicken the membrane interface between the outermost and next inner layers of flesh without appreciably affecting the interfaces between subsequent layers of flesh. The root and stem ends are then cut off, and the outermost layers of flesh of each onion bulb and any outer skin adherant thereto is cut longitudinally along the root-stem axis of the bulb to provide a slit therealong. The so-slit onion bulb is then gripped at opposite sides of and along the slit, and the slit outermost layer of flesh and any adherant skin are pushed downwardly and stripped from the onion bulb, followed by separation of the strippings and the remaining bulb. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

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United States Patent No. 4,141,201

This patent discloses apparatus for removing the tops of plants, such as onions, prior to the harvesting of the plants which includes a fixed or main frame secured to a tractor and a floating frame secured to the fixed frame and movable with respect thereto. The floating frame includes rotating fingers for lifting the top and a rotating cutter blade for cutting the tops. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,202,261

This patent discloses onions which are lifted and transported individually and are transferred in succession onto an orientation conveyor where the onions are made to roll on a path of least resistance until their stem axes are transverse to the line of movement of the conveyor. Following orientation, the onions are gripped individually and carried into engagement with a pair of laterally spaced trimming blades which cleanly snip off the protrusions at the ends of each onion along the stem axis to prepare the onions for further processing. During their movement toward the trimming blades by the gripping and carrying means, the onions engage blade connected camming means which automatically adjusts the lateral spacing of the trimming blades responsive to variations in onion size. Following the trimming operation, the onions are released automatically into a collector means. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,236,581

This patent discloses a harvesting machine for root row crops, such as onions, radishes, parsley, turnips, turnip greens, carrots, and the like wherein the individual plants have root bodies within the soil and tops above the ground. The harvesting machine has at least one harvesting wheel mounted on a vehicle for movement along a plant row and provided about its perimeter with a pair of annular, axially confronting plant top gripping means which open and close locally as the wheel turns, in a manner such that the gripping means open within a plant receiving zone within the bottom of the wheel to receive between the gripping means the tops of the plants in the plant row being harvested, and the gripping means then close to grip the intervening plant tops, extract the plants from the ground, and transport the extracted plants upwardly through a transfer zone to an upper plant releasing zone, where the gripping means reopen to release the plants from the wheel. Plant treatment means may be arranged about the wheel perimeter for washing, trimming, brushing, and/or chilling the harvested plants during their transit from the plant receiving zone to the plant releasing zone of the harvesting wheel. The harvested plants may be released in groups from the harvesting wheel for bundling in bunches by a worker positioned on the vehicle adjacent the harvesting wheel. Alternatively, the plants may discharge from the wheel into a plant receiver equipped with a trimmer for trimming the tops from the plants. The described, presently preferred embodiment of the harvesting machine has a plurality of harvesting

wheels for simultaneously harvesting the plants in a plurality of adjacent plant rows and seeding means for immediately reseeding the plant rows. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,244,252

This patent discloses whole oriented onions which are sliced in a slicer by holding the onions on a horizontal cutter-bearing plate and by rotating the plate to continuously remove slices from the lower ends of the onions until the onions are fully sliced. Non-oriented onions are recirculated between a feed hopper and the conveyor leading to the slicer. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,258,618

This patent discloses onions that are lifted and transported individually and are transferred in succession onto an orientation conveyor where the onions are made to roll along a belt conveyor driven in the opposite direction to align the stem axes transverse to the line of movement of the conveyor. Following orientation, the onions are gripped individually and carried into engagement with a pair of laterally spaced trimming blades which cleanly snip off the protrusions at the ends of each onion along the stem axis to prepare the onions for further processing. During their movement toward the trimming blades by the gripping and carrying means, the onions engage blade connected camming means which automatically adjusts the lateral spacing of the trimming blades responsive to variations in onion size. Following the trimming operation, the onions are released automatically into a collector means. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,361,084

This patent discloses vegetables such as onions that are rotated about their axes which are vertically oriented. As the vegetables move from an orienting unit to a cutting/notching mechanism, their rectilinear movement is ensured by engaging their opposite sides by opposed members which are linked so as to move equal lateral distances when they are deflected by the vegetables. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,430,933

This patent discloses a machine for accomplishing the removal of leaves and other unwanted portions from vegetables comprising an elongate shear bar having two

opposed, machined edges and a pair of elongate members mounted for rotation in close proximity to the machined edges. Each of the elongate rotary members are of the approximate length of the shear bar, and each has at least one helically configured raised portion extending along a substantial portion of its length, with the raised portion of each rotary member being arranged to operate close to the respective machined edge of the shear bar, such that a shearing action can be accomplished without damage to the vegetables. The direction of rotation of each of the elongate rotary members with respect to the adjacent machined edge of the shear bar, and the angle of the helically configured raised portions are such that vegetables or the like placed on the rotary members are caused to be moved toward one or the other of the machined edges of said shear bar, such that stems, roots or other unwanted components can be sheared from the vegetables as a consequence of the interaction between the raised portions of the rotary members, and the respective machined edges of the shear bar. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,450,762

This patent discloses apparatus for flame peeling onions comprising a pair of parallel spaced apart rails along which onions are conveyed by a worm conveyor having a central shaft mounted above and parallel to the rails and having a periphery formed by helical teeth positioned in close proximity to the rails. Curved guards extend outwardly and upwardly from the rails adjacent to the worm conveyor periphery and direct onions displaced from the rails back onto them. A plurality of gas burners located directly below the rails are adapted to scorch the skins of onions being conveyed on the rails. Onions are loaded singly onto the rails from a container by a rotatable wheel having peripheral scoops, the wheel being mounted so that the scoops pass through and collect onions from the container and deposit them onto a chute leading to the rails. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,457,224

This patent discloses an apparatus for stripping onions, in which an onion is withdrawn into a cylindrical onion guide path by vacuum pressure produced as compressed air is discharged at a high speed from a nozzle and is discharged from the cylindrical path into a separating chamber facing the path due to the momentum of the onion, whereby the onion is stripped as it is struck by compressed air discharged from the nozzle. The cylindrical onion guide path has a diameter large enough to permit passage of one onion, and onions are supplied one after another at a predetermined interval. The separating chamber is a cylindrical path coaxial with the onion guide path. The lines of discharge of the compressed air intersect one another on the center line of the onion guide path. Beyond the separating chamber, there is provided a direction converter for converting the axial direction of progress of the stripped onion into a lateral direction. The peelings separated from the stripped onion are led through the direction converter and are discharged through a separate route. However, this patent does not teach the

removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,481,875

This patent discloses a bulb peeling apparatus wherein a means of incising grooves on the outer peripheral surface skins of bulbs while rotating the bulbs is arranged in the course of a bulb conveying means and a compressed air blowing means is arranged further in the rear of the groove incising means so as to peel off the surface skins. It is positive to manually peel off surface skins of bulbs. However, in order to peel off the surface skins of a large volume of bulbs, the rise of the labor and production costs will be inevitable and a mechanical means will have to be naturally resorted to. In the bulb peeling apparatus of the present invention, a means of forming incised grooves on the outer peripheral surface skins of bulbs while rotating the bulbs is provided in the course of a bulb conveying means so as to peel off the surface skins of a large volume of bulbs. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,524,681

This patent discloses an apparatus and process for the rapid removal of outer coverings and other unedible portions from food products with minimal loss of or damage to edible portions. The process has proven to be effective in the peeling of fruit and vegetable crops, coring peppers, shelling of legume seed pods, shucking and silking corn, popping corn, skinning onions, shelling of nut crops, scaling and skinning of fish, and removal of shells from shellfish. These processes are accomplished with an apparatus which heats the surface of the product very rapidly in an atmosphere of superheated steam under elevated pressure, supplemented with radiant heat from a vessel wall, and then flashes to atmospheric pressure by instantaneous opening of the vessel cover. The result is an explosion which blows the product from the vessel and simultaneously blasts the covering from the product by violent action of highly energized moisture beneath the product covering. In the particular case of the pimiento and bell peppers, the unedible core is also blown free of the edible pod during the thermal blast treatment. Suitable means are provided for catching the product as it leaves the vessel. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,585,073

This patent discloses an agricultural tool assembly which is usable on a variety of implements in place of shovels, blades, tines or sweeps and on novel cultivating or crop root undercutting implements and the like. Assembly includes a rotary disk mounted on a lower end of a rotary spindle. An offset mount for the spindle includes a shank adapted to be received in the vertical slot of a clamp and a sleeve offset from the shank for rotatably supporting the spindle. The sleeve is connected to the shank, using a

bifurcated portion comprised of spaced plates connected to the sleeve with a lower pivot member and an upper fastener extending through arcuate slots in the spaced plates. The disk may be tilted at a selected angle or set horizontally and for some applications may be set to release in the event the blade strikes an obstruction. A cultivator implement has front and rear disk gangs and a rear centered tool assembly. An onion undercutting implement has a front tool bar with front tool assemblies clamped thereto and a rear tool bar with rear tool assemblies clamped thereto. A planter attachment has a support frame that disposes a tool assembly ahead of the planter to cut the old crop prior to have the planter deposit the seed. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,602,559

This patent discloses a machine for automatically peeling vegetables, particularly onions, and also some fruits. The peeling machine consists of a conveyor belt with devices for holding an individual onion, spaced along the belt, a cutter station where the two ends of the onion are removed as the belt is moved past the station, a reciprocating blade that slits the two outer layers of the onion and a station consisting of two rotating rolls and an air jet where the two outer layers are removed from the onion. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,629,005

This patent discloses a harvester for bulb, root and leafy vegetable products including stationary blades, rotatable discs or the like which are transported at an angle through opposite sides of a product plant bed to loosen the soil, cut the root system, and prepare the products for removal from the plant bed; a pair of opposing, rotatable belts which follow an inclined path and cooperate to define a product passageway therebetween, said belts defining a product lifting and transport section in which adjustable, pressure pulleys ensure proper gripping pressure on the products, and a product orienting section in which the products are transformed from a vertical to a horizontal disposition; support means adjacent said product orienting section for receiving tops of products oriented to a horizontal disposition; and conveyor means adjacent an end of said product passageway for receiving freed, horizontally disposed product. A soil removal means may also be employed beneath and axial to the product passageway along belts 51, 51' and includes an oscillatable rod which vibrates the root system of the product to dislodge soil therefrom. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,658,713

This patent discloses a first and a second leading member in opposite relation with one another and are supported for movement in a direction axially of a cutting apparatus. A first and a second cutter are supported for movement integral with the respective leading members and are disposed in opposite relation with one another and at locations downstreams of the leading members in a direction transversely of the apparatus and closer to the bulb to be cut than the leading member in the direction axially of the apparatus. The leading members move toward one another and the respective cutters are rotatably driven by motors. The leading members are adapted to abut against the bulb, to be displaced away from one another by the bulb so as to cause the cutters to assume their desired positions for a cutting operation. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,660,653

This patent discloses an agricultural tool assembly which is used with a planter attachment. Assembly includes a rotary disk mounted on a lower end of a rotary spindle. An offset mount for the spindle includes a shank adapted to be received in the vertical slot of a clamp and a sleeve offset from the shank for rotatably supporting the spindle. The sleeve is connected to the shank, using a bifurcated portion comprised of spaced plates connected to the sleeve with a lower pivot member and an upper fastener extending through arcuate slots in the space plates. The planter attachment has a support frame that disposes the tool assembly ahead of the planter to cut the old crop prior to having the planter deposit the seed. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,718,334

This patent discloses an apparatus for cutting and removing stems and roots of bulbs which include a carrying element for the bulb, a centering element, cutting elements for the stem and the root, and a holding element to hold the bulb. The central position, between an upper cutter and a lower cutter arranged in said cutting element, and the similar central position between the upper portion and the lower portion of the bulb are both arranged to be on a reference line located at a predetermined height above a base reference such as a floor. The holding part of the holding element is moved from the centering element to the cutting element, for cutting of the stem and the root thereby, along the base line while said holding part is holding the bulb. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,753,296

This patent discloses an apparatus for harvesting vegetables such as onions, including a topping plenum and a root cutting bed. Onions are removed from the ground by a self-adjusting digger conveyor which conveys them to an elevator conveyor. The elevator conveyor rises steeply over the large diameter, wide tires which convey the apparatus through the field. From thence the onions are conveyed beneath a vacuum plenum through a first air flow zone which is baffled so that the air flow is just sufficient to raise the tops of the onions off the conveyor and then through a second air flow zone where the onions are actually lifted off the conveyor and into registry with a registering and cutting means which cuts the tops off the onions. From thence they drop onto a root cutting bed which removes the roots of the onions and conveys them to a bulk loading conveyor. Dirt and offal drawn into the vacuum fan are conveyed out of the vacuum fan housing by a continuous conveyor system. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 4,792,455

This patent discloses a method for preserving foodstuffs including fruits and vegetables, especially geophytes and mushrooms, which are prepared and packaged ready for consumption, the foodstuff is sealed into a container into which pure oxygen is introduced in order to improve preservation of the foodstuffs' appearance and taste during storage. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 5,000,087

This patent discloses a cutting apparatus for a root and a stem of an onion, a plurality of first swing links composed of a plurality of parallel link rods and a plurality of second swing links composed of a plurality of parallel link rods are mounted to a machine frame for vertically angular movement. A first and second supports are mounted respectively to one ends of the respective first swing links and to one ends of the respective second swing links for angular movement. A first and a second cutting edges are provided respectively on the first and second supports in facing relation to each other for angular movement, with cutting planes of the respective first and second cutting edges maintained horizontal. A first and a second guides are arranged respectively at the first and second supports so as to project respectively from front parts of the respective first and second supports. Biasing means is arranged at the second swing links for moving the first and second cutting edges toward each other. A single drive unit is arranged at the machine frame for rotating the first and second cutting edges. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 5,225,233

This patent discloses a process for preparing food material, the process comprising the steps of: concurrently dehydrating and shaping a hydrated fibrous material (HFM) by compression which material is prepared from soybean protein; and heating the obtained shaped product in a compressed state. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 5,316,778

This patent discloses a method for processing common varieties of leafy vegetables to extend its storage life. The leafy vegetables are selected, cut, trimmed and conveyed to a processing area. During processing, the leafy vegetable leaves are torn rather than cut from the vegetable stems. Once cored, the leafy vegetables are washed in chlorinated water, dried and then chilled prior to final distribution. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 5,437,886

This patent discloses a hard-frozen anisotropic foodstuff which is subjected to a process of "veneer-peeling" at a core temperature of -40.degree. C. to -5.degree. C. In this "veneer-peeling" the hard-frozen foodstuff is for example cut in the manner of a lathe or like a pencil-sharpener. If the foodstuff is raw or uncooked meat, veneer-peeling weakens or fragments the strong connective tissue within the meat whilst retaining the essential fibrous character of the muscle fibers resulting in less tough meat. Thus lower quality meat can be upgraded. A wide array of morphologies of meat particles can be prepared. Other food materials cut in this way are ice cream, coconut, vegetables and hide material leading to offcut with new and useful morphologies. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 5,518,747

This patent discloses the process of preserving a quantity of diced vegetables which combines a given quantity of the vegetables with a preselected amount of water (including ice) and acid such as citric acid. The amount of acid is equal to approximately five percent of the amount of water by weight. The vegetables, water and acid are thoroughly mixed together producing a slurry. This slurry is located within a mixing chamber with a vacuum being drawn on that mixing chamber to between twenty five and twenty nine inches of mercury. The mixing chamber is moved to achieve an intermixing between the ingredients for a preestablished period of time generally in the range of ten minutes to forty five minutes. The ingredients are then removed from the mixing chamber with the liquid removed from the vegetables then placed within

containers for shipment and refrigerated. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 5,750,171

This patent discloses a finish topper for bulb crops having a plurality of longitudinal, parallel, generally horizontal, spaced-apart moving belts for conveying bulbs through the apparatus. Adjacent belts are driven at different linear speeds. In a preferred embodiment, alternate belts are replaced by stationary rails to maximize the speed differential. Below and adjustably close to the belts is a driven rotating blade for cutting the bulb stems and also exerting a downwards draft of air through the belts. Onions introduced onto the belts are conveyed through the apparatus by the belts, and the differential in speed between the moving belts and stationary rails causes the bulbs to rotate and gyrate randomly as they are being conveyed. Because the belts are spaced apart, the bulbs assume momentarily an attitude to permit the uncut stems of bulbs to extend downwardly between the belts. The bulbs are retained on their shoulders on the belts in inverted posture. Each bulb, in its random rotational movements, assumes this attitude at least once, at which time the stem is immediately sheared to the proper residual length by the rotating blade. When the belts are covered by a flexible blanket the random gyrations of the onions is increased. Since each onion is restrained by its shoulders against the belts, the residual stem of every onion is equal in length as measured from the onion shoulder. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 6,053,098

This patent discloses a rotary root vegetable slicer that is reliably held at an installed position even when water enters into the lower surface of the bed plate, and can be easily removed from the installed position. The rotary root vegetable slicer includes a bed plate of a nearly square shape as viewed on a plane, a blade-mounting member erected at an end of the bed plate for detachably mounting a plane blade and a comb blade, a rotary piece-mounting member on a portion on the other side of the bed plate opposed to the blade-mounting member so as to slide along the lengthwise direction of the bed plate, and a rotary piece having many needle-like protrusions arranged on the front surface thereof at an upper part of the rotary piece-mounting member so as to rotate. Protuberances are formed on the lower surface of the bed plate at both ends on the side of the blade-mounting member, and anti-slip pieces made of a natural rubber are fitted to the protuberances. Even when water enters into the lower surface of the bed plate while the rotary root vegetable slicer is being used, a sufficiently large frictional force is maintained owing to the natural rubber forming the anti-slip pieces, and the rotary root vegetable slicer is held on the installation surface. Since the anti-slip pieces have not been adsorbed, the rotary root vegetable slicer can be easily removed. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 6,413,566

This patent discloses simultaneous slicing and washing of relatively firm raw vegetable or fruit products in a vat of water into which a slicer apparatus is positioned such that the slices are formed and discharge directly into the water. An inclined takeout conveyor serves to receive the slices and remove them from the water. A circulating water current and fluid jets urge the slices to disperse onto the conveyor. A spray of water or air blast removes residual vegetable matter from the slice surfaces before leaving the takeout conveyor for further processing. Slicing and washing a vegetable in a flume volute where the slices are dispersed onto a takeout conveyor is disclosed where the water medium is collected in a tub and recycled back to flow in the flume to a level that covers the slicer's operative parts. The apparatus may be used for simultaneous slicing and cooking of raw vegetables where hot cooking oil is maintained in the system and recycled for reheating. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 6,419,028

This patent discloses a harvester for ground surface crops comprising an array of bars connected to cross-members, each bar having an obtuse angulation toward the front end of the bar. The arrays describe surfaces which may be curved or substantially planar on either side of the obtuse angle. The bars are spaced closely enough to be smaller than the size of the parts of the plants of the ground surface crop to be harvested, and spaced far enough apart to permit weeds and other debris to drop between the bars to the ground. The harvester apparatus is used by moving it forward, front end first, along the ground sufficiently into the soil surface to slip underneath the crop-parts to be gathered. As the front parts of the bars slips underneath the crop-part to be gathered, the crop-part is lifted from the soil by the forward motion of the harvester and ramped upward and rearward along the incline of the bars, and is thereby detached from the soil surface. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 6,443,234

This patent discloses a field harvester and trimmer for root crops having foliage tops growing from the crowns of the crop to be harvested and trimmed, such as large bulbous onions, turnips, parsnips and rutabagas, consisting of a movable vehicle having at least a forward mounted severing and lifting mechanism and trimmer, the improvement comprising a series of rotating and caged flail drum sub-assemblies for trimming the foliage tops and roots of the gathered crop the results of which is a surprisingly enhanced trimmed state. In accordance with the invention, the series of caged, rotating flail drum sub-assemblies of the invention each includes independently rotating dissectable cylindrical cage circumferential of a series of transverse knives mounted on a central, independently driven shaft. The cylindrical cage includes a side wall preferably provided with a plurality of slots defining major axes of symmetry

substantially transverse to axis of rotation of the central driven shaft. When tops or roots of the gathered crop penetrate the slots, only the tip portions of the knives are adapted to contact such tops or roots thereby defining a maximum cutting solid of rotation centered at a selected, constant radial distance from the axis of rotation of the central shaft. Result: a surprising rapid harvesting and trim rate. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

United States Patent No. 6,484,810

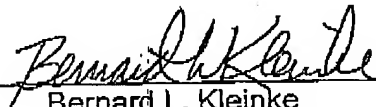
This patent discloses a mechanical harvester for harvesting, topping and sacking bulb crops, such as onions. The harvester extracts the onions from the ground and transports them rearward to a cutting assembly by conveyor systems that drop out small onions, dirt, rocks and debris. The cutting assembly comprises a set of elongated cutting blades positioned to cooperatively accept and sever the leaves and roots from the bulb. The offal drops away from the harvester to the ground by manner of gravity. After cutting, the onions are transported through an inspection assembly for inspection, sorting, grading and further distribution. The onions are then transported rearward to a sacking assembly for placing the onions into sacks, to a chute device returning the onions to the ground or to a conveyor system transferring the onions to an adjacent vehicle. Platforms on the sides and ends of the harvester facilitate the above operations. However, this patent does not teach the removal of roots or portions thereof by non-cutting techniques during post-harvesting processing.

Date: April 29, 2004

Respectfully submitted,

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